

Lab 2 - RIPv2

Lab 2: IP routing protocol lab — RIP version 2

The physical topology is as shown in Figure 15–2.

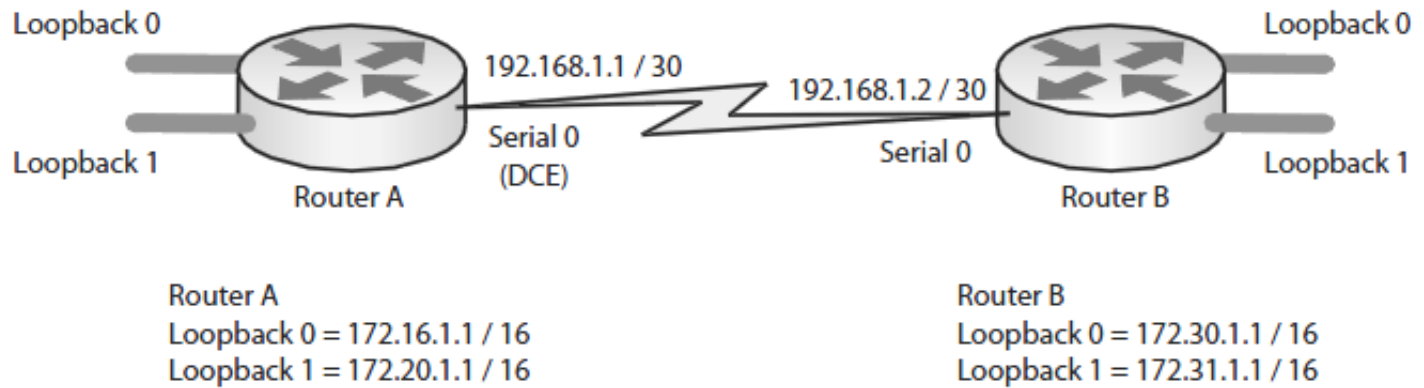


Figure 15–2: RIP v2

Lab exercise

Your task is to configure the network in Figure 15–2 to allow full connectivity using the routing protocol RIP version 2. Please feel free to try the lab without following the lab walkthrough section.

Text printed in a monospaced font indicates commands that can be entered on the router.

Purpose

RIPv2 is fairly common in smaller networks. It is our first look at classless routing and will provide a valuable foundation for more advanced routing protocols later on.

Lab objectives

1. Use the IP addressing scheme depicted in Figure 15–2. Router A needs to be configured with a clock rate on interface serial 0. Set this to 64000.
2. Set telnet access for the router to use the local login permissions of username “banbury” and the password “ccna”.
3. Configure the “enable password” to be “cisco”.
4. Configure the routing protocol RIPv2 to advertise all networks attached to the router.
5. Ensure the routing information is correct by checking the routing table for entries of your neighbor's addresses.
6. Finally, try to ping all loopback interfaces of your neighbor, and then try to access your neighbor router via telnet.

Lab walk-through

1. To set the IP addresses on an interface you will need to do the following:

```
Router#config t
Router(config)#hostname RouterA
RouterA(config)#
RouterA(config)#interface serial 0
RouterA(config-if)#ip address 192.168.1.1 255.255.255.252
RouterA(config-if)#clock rate 64000 « If this is the DCE side
RouterA(config-if)#no shutdown
RouterA(config-if)#interface loopback 0 (no need for “no shutdown” on
loopback interfaces)
RouterA(config-if)#ip address 172.16.1.1 255.255.0.0
RouterA(config-if)#interface loopback 1
RouterA(config-if)#ip address 172.20.1.1 255.255.0.0
RouterA(config-if)# ^ Z
RouterA#
```

Router B:

```
Router#config t
Router(config)#hostname RouterB
RouterB(config)#
RouterB(config)#interface serial 0
RouterB(config-if)#ip address 192.168.1.2 255.255.255.252
RouterB(config-if)#no shutdown
RouterB(config-if)#interface loopback 0
RouterB(config-if)#ip address 172.30.1.1 255.255.0.0
RouterB(config-if)#interface loopback 1
RouterB(config-if)#ip address 172.31.1.1 255.255.0.0
RouterB(config-if)# ^ Z
RouterB#
```

2. To set the clock rate on a serial interface (DCE connection only) you need to use the “clock rate #” command on the serial interface, where # indicates the speed:

```
RouterA(config-if)#clock rate 64000
```

Ping across the serial link now .

3. To set telnet access you need to configure the VTY lines to allow telnet access: to do this type (from configuration mode):

RouterA(config)#line vty 0 4 « **Enters the VTY line configuration**

RouterA(config-line)#login local « **This will use local usernames and passwords for telnet access**

RouterA(config-line)#exit « **Exit the VTY config mode**

RouterA(config)#username banbury password ccna « **Creates username and password for telnet access (login local)**

Router B:

RouterB(config)#line vty 0 4

RouterB(config-line)#login local

RouterB(config-line)#exit

RouterB(config)#username banbury password ccna

4. To set the “enable password”, do the following:

RouterA(config)#enable secret cisco « **Sets the “enable secret” password (encrypted)**

Router B:

RouterB(config)#enable secret cisco

5. To configure RIP on a router, there are two steps: first, enable the routing protocol; and second, specify the networks to be advertised by RIP:

RouterA(config)#router rip « **Enables RIP routing process**

RouterA(config-router)#version 2 « **Enable RIPv2**

RouterA(config-router)#network 192.168.1.0

RouterA(config-router)#network 172.16.0.0

RouterA(config-router)#network 172.20.0.0 « **Specifies the networks for RIPv2 to advertise; one network statement is needed for every network advertised.**

Router B:

RouterB(config)#router rip

RouterB(config-router)#version 2

RouterB(config-router)#network 192.168.1.0

```
RouterB(config-router)#network 172.30.0.0
```

```
RouterB(config-router)#network 172.31.0.0
```

6. Use the “show ip route” command to determine if the networks being advertised by your neighbor's RIP process are in your routing table.

```
RouterA#show ip route
```

Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B -

BGP D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area

N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2

E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP

i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter

area * - candidate default, U - per-user static route, o - ODR

P - periodic downloaded static route

Gateway of last resort is not set

```
C    172.16.0.0/16 is directly connected, Loopback0
```

```
C    172.20.0.0/16 is directly connected, Loopback1
```

```
R    172.31.0.0/16 [120/1] via 192.168.1.2, 00:00:05, Serial0
```

```
R    172.30.0.0/16 [120/1] via 192.168.1.2, 00:00:05, Serial0
```

```
    192.168.1.0/30 is subnetted, 1 subnets
```

```
C    192.168.1.0 is directly connected, Serial0
```

```
RouterA#
```

You can check that RIPv2 is enabled with the “show ip protocols” command on both sides.

```
RouterA#show ip protocols
```

```
Routing Protocol is "rip"
```

```
Sending updates every 30 seconds, next due in 14 seconds
```

```
Invalid after 180 seconds, hold down 180, flushed after 240
```

```
Outgoing update filter list for all interfaces is not set
```

```
Incoming update filter list for all interfaces is not set
```

```
Redistributing: rip
```

```
Default version control: send version 2, receive version 2
```

Interface	Send	Recv	Triggered	RIP Key-chain
Loopback0	2	2		
Loopback1	2	2		
Serial0	2	2		

Automatic network summarization is in effect

Maximum path: 4

Routing for Networks:

172.16.0.0

172.20.0.0

192.168.1.0

Routing Information Sources:

Gateway	Distance	Last Update
---------	----------	-------------

192.168.1.2	120	00:00:08
-------------	-----	----------

Distance: (default is 120)

RouterA#

You can debug RIP packets with the “debug ip rip” command:

RouterA#debug ip rip

RIP protocol debugging is on

RouterA#

01:58:03: RIP: received v2 update from 192.168.1.2 on Serial0

01:58:03: 172.30.0.0/16 via 0.0.0.0 in 1 hops « **Subnet mask advertised**

01:58:03: 172.31.0.0/16 via 0.0.0.0 in 1 hops

01:58:21: RIP: sending v2 update to 224.0.0.9 via Loopback0 (172.16.1.1)

01:58:21: RIP: build update entries

01:58:21: 172.20.0.0/16 via 0.0.0.0, metric 1, tag 0

01:58:21: 172.30.0.0/16 via 0.0.0.0, metric 2, tag 0

01:58:21: 172.31.0.0/16 via 0.0.0.0, metric 2, tag 0

01:58:21: 192.168.1.0/24 via 0.0.0.0, metric 1, tag 0

01:58:21: RIP: sending v2 update to 224.0.0.9 via Loopback1 (172.20.1.1)

01:58:21: RIP: build update entries

01:58:21: 172.16.0.0/16 via 0.0.0.0, metric 1, tag 0

01:58:21: 172.30.0.0/16 via 0.0.0.0, metric 2, tag 0

01:58:21: 172.31.0.0/16 via 0.0.0.0, metric 2, tag 0

```
01:58:21:      192.168.1.0/24 via 0.0.0.0, metric 1, tag 0
01:58:21: RIP: sending v2 update to 224.0.0.9 via Serial0 (192.168.1.1)
01:58:21: RIP: build update entries « Enter “un all” to turn off
```

If you add the “no auto-summary” command under the RIP config for both routers A and B, the router will then advertise the correct /30 mask for the 192.168.1.x network.

```
RouterA#config t
```

```
RouterA(config)#router rip
```

```
RouterA(config-router)#no auto-summary
```

```
RouterA(config-router)# ^Z
```

```
RouterA#debug ip rip
```

```
RIP protocol debugging is on
```

```
RouterA#
```

```
01:26:41: RIP: received v2 update from 192.168.1.2 on Serial0
```

```
01:26:41:      172.30.0.0/16 via 0.0.0.0 in 1 hops
```

```
01:26:41:      172.31.0.0/16 via 0.0.0.0 in 1 hops
```

```
01:26:55: RIP: sending v2 update to 224.0.0.9 via Loopback0 (172.16.1.1)
```

```
01:26:55: RIP: build update entries
```

```
01:26:55:      172.20.0.0/16 via 0.0.0.0, metric 1, tag 0
```

```
01:26:55:      172.30.0.0/16 via 0.0.0.0, metric 2, tag 0
```

```
01:26:55:      172.31.0.0/16 via 0.0.0.0, metric 2, tag 0
```

```
01:26:55:      192.168.1.0/30 via 0.0.0.0, metric 1, tag 0
```

To test connectivity you will need to use the ping command, and to logon to your neighbor's router you need to use the telnet command:

```
RouterA#ping 172.30.1.1 « This will send a ping packet to the  
address specified; there should be five replies if everything is OK
```

```
RouterA#ping 172.30.1.1
```

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 172.30.1.1, timeout is 2 seconds:

```
!!!!
```

Success rate is 100 percent (5/5), round-trip min/avg/max = 32/32/32 ms

```
RouterA#
```

```
RouterA#ping 172.31.1.1
```

RouterA#telnet 172.30.1.1 « **This will open a telnet connection to your neighbor's router. If telnet access has been set up correctly you should be presented with a login message.**

Router B:

```
RouterB#ping 172.16.1.1
```

```
RouterB#ping 172.20.1.1
```

```
RouterB#telnet 172.16.1.1
```

7. Now, please enter reload at the "Router#" prompt and type "yes".

Show runs

```
RouterA#show run
```

Building configuration...

Current configuration : 796 bytes

!

version 12.1

service timestamps debug uptime

service timestamps log uptime

no service password-encryption

!

hostname RouterA

!

enable secret 5 \$1\$rujl\$BJ8GgiK8U9p5cdfXyApPr/

!

username banbury password 0 ccna

!

ip subnet-zero

!

interface Loopback0

ip address 172.16.1.1 255.255.0.0

!

```
interface Loopback1
 ip address 172.20.1.1 255.255.0.0
!
interface Ethernet0
 no ip address
 shutdown
!
interface Serial0
 ip address 192.168.1.1 255.255.255.252
 clockrate 64000
!
interface Serial1
 no ip address
 shutdown
!
interface BRI0
 no ip address
 shutdown
!

router rip
 version 2
 network 172.16.0.0
 network 172.20.0.0
 network 192.168.1.0
!
ip classless
 no ip http server
!
line con 0
!
line aux 0
line vty 0 4
 login local
!
```


end

RouterA#

RouterB#show run

Building configuration...

Current configuration : 782 bytes

!

version 12.1

service timestamps debug uptime

service timestamps log uptime

no service password-encryption

!

hostname RouterB

!

enable secret 5 \$1\$ydeA\$MyfRKevOckjm7w/0ornnB1

!

username banbury password 0 ccna

!

ip subnet-zero

!

interface Loopback0

ip address 172.30.1.1 255.255.0.0

!

interface Loopback1

ip address 172.31.1.1 255.255.0.0

!

interface Serial0

ip address 192.168.1.2 255.255.255.252

!

interface Serial1

no ip address

```
shutdown
!
interface Ethernet0
  no ip address
  shutdown
!
interface BRI0
  no ip address
  shutdown

!
router rip
  version 2
  network 172.30.0.0
  network 172.31.0.0
  network 192.168.1.0
!
ip classless
no ip http server
!
line con 0
!
line aux 0
line vty 0 4
  login local
!
end
```

RouterB#



